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ANALYSIS OF THE LITERATURE AND OTHER EXISTING DATA ON 22 SPECIES OF BATS OCCURRING IN THE CALIFORNIA DESERT. Completed May 1980.

by

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ARIZONA MYOTIS

Myotis occultus

SIGNIFICANCE

The Arizona myotis is at the western limit of its range along the Colorado River. Specimens have been recorded from Blythe to Yuma, although none in the past thirty years.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Myotis occultus occurs from southeastern California eastward through Arizona, New Mexico, and south central Colorado, and south into Chihuahua. In Arizona, it is most commonly observed in pine forests at elevations between 6,000 and 9,000 feet, but may wander into lower elevations near water sources (Barbour and Davis, 1969).

Myotis occultus is closely related to *Myotis lucifugus*. Findley and Jones (1967) have suggested that the Arizona myotis may not be a valid species. Specimens of hybrids exist from northern New Mexico and southern Colorado.

California and CDCA

The Arizona myotis is in the western extent of its range in California. In the 1930's, Ken Stager (1943) located a colony under a highway bridge over the Colorado River at Blythe, and in 1943 Denny Constantine (pers. comm.) collected from this

location. The bridge no longer exists and no further specimens have been taken in California. A few old records are from the area around Yuma in California.

HABITAT REQUIREMENTS

Stager (1943) found an adult male Myotis occultus roosting in a mine tunnel in the Riverside mountains. Other than this, the only known roost is between the timbers of the highway bridge at Blythe. In the rest of their range, they have been found roosting in attics and under bridges, often sharing the roost with Myotis yumanensis and velifer, and Tadarida brasiliensis (Hayward, 1963; Barbour and Davis, 1969).

In California, they undoubtedly forage over the Colorado River floodplain. Further east they are known to forage over ponds and clearings in forested areas.

POPULATION STATUS IN THE CDCA

With the destruction of the Blythe highway bridge, it is doubtful if this species now resides in California. It is possible that individuals from roosts in Arizona forage over the Colorado River. As is the case with Myotis velifer, Myotis occultus is at the western limit of its range in California.

IMPACTS ON HABITAT

Since the Arizona myotis prefers to roost in manmade structures, any disturbance to these roosts, such as the

dismantling of a highway bridge, adversely affects the population. More information is needed to adequately assess its habitat requirements.

ADDITIONAL DATA NEEDS

Surveying bridges and buildings along the Colorado River may lead to the rediscovery of this species in California. Mist-netting along the floodplain may yield some additional records.

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BIG BROWN BAT

Eptesicus fuscus

SIGNIFICANCE

The big brown bat is encountered roosting in mine tunnels and old buildings. It appears to be more tolerant of human intrusion than most species. Though more abundant in coastal areas of southern California, it is locally common in the desert.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Eptesicus fuscus occurs throughout the continental United States (with the exception of southern Texas and Florida), from Alaska and Canada south to northern South America, including the Caribbean Islands. Its winter and summer ranges are identical (Barbour and Davis, 1969).

California

Eptesicus fuscus is found throughout California from lower Sonoran through Canadian life zones. The subspecies, bernardinus, occurs in northern California and higher elevations in southern California, while pallidus is found in the coastal and desert areas.

CDCA

Records exist throughout the CDCA for this bat. Several mines in the Riverside, Chocolate and Cargo Muchacho Mountains currently harbor nursery colonies, as well as the County Services Building in El Centro.

HABITAT REQUIREMENTS

Eptesicus prefers to roost in buildings and is frequently in close association with man. In the desert, the author has found this species roosting in mine tunnels where they form small colonies. The County Services Building in El Centro houses several hundred bats in the summer months. They share this roost with Tadarida brasiliensis. Other frequent associates with Eptesicus are Antrozous and Myotis yumanensis (Barbour and Davis, 1969).

Hamilton (1933) found that the big brown bat feeds principally on beetles, but that other orders of insects were also represented in guano remains. It typically feeds in open areas between trees at heights of 20-30 feet above the ground. An established foraging pattern may be followed. A less secluded night roost is then selected, and the bats rest until a predawn foraging bout.

In the east, Eptesicus hibernates overwinter, usually in caves and occasionally buildings with low temperature and humidity, where the males form tight clusters and the females roost singly or in small groups (Phillips, 1966; Davis and Hitchcock, 1964). No winter records exist for the big brown bat in southern California, including the CDCA. It is not known whether they hibernate here or migrate south for the winter months.

In southern California, Eptesicus give birth to a single baby in late May or early June (Krutzsch, 1946). The County Services Building in El Centro serves as a large

nursery roost. Several mine tunnels in the Riverside, Chocolate and Cargo Muchacho Mountains contain smaller maternity colonies. East of the Rocky Mountains, however, the litter size is two (Davis et al., 1968). The eastern population appears never to carry their young while foraging, but in Nevada, Hall (1946) found females night roosting with non-volant infants clinging to them in a spot never used during the day.

POPULATION STATUS IN THE CDCA

Scattered records exist for this bat throughout the desert, and it is locally common -- especially in mountain ranges along the Colorado River. It is more frequently encountered in coastal areas of southern California.

IMPACTS ON HABITATS

Big brown bats frequently roost in buildings and are often in association with man, which often brings about their eviction. The colony in the County Services Building is currently threatened with extermination. Research by Luckens and Davis (1964) has shown big brown bats to be ten times as sensitive to DDT as the other mammalian species studied. In agricultural areas, this may be a reason for population decline.

ADDITIONAL DATA NEEDS

A survey of potential roost sites (mines, caves and buildings) as well as mist-netting at desert water holes is necessary to accurately assess the current population status of Eptesicus in the CDCA.

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CALIFORNIA LEAF-NOSED BAT

Macrotus waterhousii californicus

SIGNIFICANCE

The California leaf-nosed bat is locally common is the California desert near water sources. The numbers appear stable at the present time, but because of its preference for warm humid mine tunnels and caves with high ceilings, it could be seriously endangered if these vulnerable roosts are disturbed.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Of the seven living subspecies of Macrotus waterhousii, only Macrotus waterhousii californicus occurs in the United States. It ranges throughout the deserts of southern California, Arizona, and southern Nevada, and south into Mexico. Other subspecies occur throughout Mexico and Guatemala and on several Caribbean islands (Anderson, 1969).

California

The majority of records for the California leaf-nosed bat are from low desert near water sources in San Diego, Imperial, Riverside and southern San Bernardino Counties. The exceptions are a 1950 record from Santa Susanna, Los

Angeles County, and a 1893 record from DeLuz in northwestern San Diego County. Apparently they no longer occur there. There are past records from mines in the Otay Mountain in southwestern San Diego County in coastal sage scrub and oak woodland. In the summer 1977, I found a mummified male in a mine in this area, and also several live males roosting in the covered aqueduct of the nearby Lake Barrett flume in coastal sage scrub. These are the only recent records outside of low desert scrub.

CDCA

The majority of the past and present records for Macrotus are from mine tunnels in mountain ranges bordering the Colorado River from Needles, California south to the Mexican border. The type specimen was collected at the site of old Fort Yuma on the California side of the Colorado River (Baird, 1859). Isolated records are known from the Coachella Valley, Palmdale, Anza Borrego (Banks, 1965), and from one mine tunnel in the Bristol Mountains north of Amboy.

HABITAT REQUIREMENTS

With the exception of the few records from chaparral and coastal sage scrub communities, the California leaf-nosed bat occurs in low desert scrub below 1000 feet.

It appears to prefer deserted mine tunnels on the sides of steep rocky canyons (Vaughan, 1959). The mine tunnels and caves chosen are usually warmer than 80°F and greater than 60% relative humidity. These bats prefer mines with high ceilings from which they hang pendant by one or both feet. They never enter crevices.

Unlike most of the bats in the CDCA, leaf-nosed bats remain active throughout the year, and do not hibernate. The sexes roost separately for most of the year, although some winter roosts contain both males and females. The winter and summer roosts may be in the same or in different mines and often contain as many as 700 bats (P. Brown, unpub. data).

The leaf-nosed bat gives birth to one young between the end of May and late June (Bradshaw 1961, 1962). Before parturition females seek warmer parts of the mine or move to other warmer mine tunnels. During this time they are particularly vulnerable to disturbance.

Each night the bats leave their roosts within two hours after dusk, often flying three feet above the ground and gleaning insects from ground level vegetation as evidenced by the capture of one individual in a mousetrap (Grinnell, 1918) and another caught on a desert shrub (Stager, 1943). They prefer moths and small beetles (Huey, 1925), which they often take to a night roost to consume. The night roost may be the same or different

from the diurnal retreat. The bats tend to have two distinct foraging peaks at dusk and pre-dawn (Vaughan, 1959).

POPULATION STATUS IN THE CDCA

California leaf-nosed bats are locally common in the CDCA. They are concentrated in certain suitable mine tunnels along the Colorado River, with records of isolated populations occurring throughout the southern desert. The population is currently stable as determined by banding studies along the Colorado River over the past fourteen years by Phil Leitner and Patricia Brown.

IMPACTS ON HABITATS

Since most of the California desert population is concentrated in only about ten mine tunnels with certain temperature and humidity requirements, any disturbance to these tunnels such as closing of the entrances or resumption of mining activities, will have a profoundly adverse effect. Since only a few tunnels are utilized as maternity roosts, any impacts to them could endanger the entire population.

ONGOING STUDIES

Since 1964 Phil Leitner and Patricia Brown (since 1968) have banded over 10,000 _Macrotus_ _waterhousii_ _californicus_

in ten mine tunnels along the Colorado River. Some bats banded fourteen years ago have been recently recaptured.

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CALIFORNIA MYOTIS

Myotis californicus

SIGNIFICANCE

This is the most common Myotis in the California desert. It roosts singly or in small groups in mine tunnels and rock crevices. This species is commonly captured in mist nets over desert water sources.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Myotis californicus occurs throughout western North America from Alaska to Chiapas and from the West Coast to west Texas. It inhabits the lower and upper Sonoran and Transition life zones and is seldom found at elevations above 6,000 feet (Barbour and Davis, 1969).

California

The California myotis is found throughout California below 6,000 feet and is represented by two subspecies -- Myotis c. californicus from the coastal and mountain regions and the paler Myotis c. stephensi from the desert.

CDCA

This bat is one of the most common bats in the California desert. It is particularly abundant near water sources and is often encountered roosting singly in mine tunnels.

HABITAT REQUIREMENTS

As previously stated, this bat inhabits a variety of habitats at lower elevations from arid desert scrub to riparian situations to pinyon-juniper and oak woodland. It prefers to roost in crevices either in cliffs or mines, or else in manmade structures such as buildings or bridges. It never forms large colonies, and is often found roosting singly. Phil Krutzsch (1954) once located a nursery colony of twenty-five adults behind a sign. Although their diurnal retreats are secluded, they often choose a more superficial site in which to night roost between foraging bouts.

The California myotis forages about five to ten feet above the ground. It can be identified by its slow erratic flight and small size. It is often active on warm winter days, along with Pipistrellus. O'Farrell et al. (1967) have mist-netted Myotis californicus on cold winter nights in Nevada at ambient temperatures of 6°C. It is often found torpid in mine tunnels in winter in the CDCA.

POPULATION STATUS IN THE CDCA

The California myotis is abundant in the CDCA, where it is one of the most frequently encountered bats both in mine tunnels and while mist-netting over desert waterholes.

IMPACTS ON HABITAT

This bat is particularly vulnerable during winter hibernation when it is found torpid in mine tunnels, caves, and buildings.

Any arousal serves to deplete its fat stores and may endanger its survival until spring. It is found over such a wide geographical and ecological range in the CDCA that unless widespread destruction of habitat occurred, there would be no appreciable impact.

ADDITIONAL DATA NEEDS

There are many areas in the desert from which specimens of *Myotis californicus* are lacking, but this is probably only because these areas have not been mist-netted or adequately sampled.

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CANYON BAT OR WESTERN PIPISTRELLE

Pipistrellus hesperus

SIGNIFICANCE

This is the smallest North American bat and also the most abundant in the CDCA. Pipistrellus hesperus roosts singly in rock crevices. They are often observed flying before dusk and are frequently captured in mist nets over water sources.

GEOGRAPHICAL DISTRIBUTION

Worldwide

The canyon bat occurs throughout the deserts of the southwestern United States and south to the Mexican states of Michoacan and Hidalgo. It ranges north into the interior deserts of Washington and Oregon.(Barbour and Davis, 1969).

California

Pipistrellus hesperus merriami is found from the Central Valley south at elevations below 5000 feet. It is much more common in the desert than along the coast or interior valleys.

CDCA

The western pipistrelle is found throughout the California desert. It is most commonly encountered in rocky canyons at lower elevations.

HABITAT REQUIREMENTS

Pipistrelles roost singly in rock crevices in the walls of desert canyons, or occasionally in mine tunnels or under rocks (Von Bloeker, 1932; Stager, 1943). These diurnal retreats are seldom discovered, but at dusk the desert air will become alive as hundreds of these tiny bats emerge from their hiding places.

Their tiny size and slow flight make them easy to identify as they forage over the creosote bush flats, often miles from suitable rocky roosting sites. They emerge to feed before the sun sets and often remain active after dawn. They roost during the middle of the night, probably on cliff faces (Cross, 1965).

The canyon bat is one of the few species to remain active during the winter, often hunting during the middle of the day if the weather is warm. However, O'Farrell *et al.* (1967) have found them to be active when the ambient temperature was 1°C.

Maternity roosts of this species are seldom discovered. Solitary mothers and babies are occasionally reported from rock crevices. Koford and Koford (1948) found a dozen females and their babies behind the shutters of an adobe house in July. For such a tiny bat, they usually give birth to two young (Barbour and Davis, 1969).

POPULATION STATUS IN THE CDCA

Pipistrellus hesperus is probably the most widespread and abundant bat in the CDCA.

IMPACTS ON HABITATS

Since this bat does not concentrate like other species in a few desirable caves and mines, but is rather evenly distributed in rocky crevices throughout the desert, it is difficult to adversely effect the population. They forage over a diversity of habitats, including creosote bush flats. They do not appear to be in any way endangered.

ADDITIONAL DATA NEEDS

Mist-netting anywhere in the desert, especially near water sources, should yield additional records of this bat.

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CAVE MYOTIS

Myotis velifer

SIGNIFICANCE

The cave myotis reaches the western extent of its range along the Colorado River. Although forty years ago it was fairly common here, the population in California is declining and limited to a few mine tunnels.

GEOGRAPHICAL DISTRIBUTION

Worldwide

The cave myotis is found from Kansas, Texas and Oklahoma west through New Mexico and Arizona. Its range extends south through Mexico to Honduras. It is a common bat in the Texas limestone caves, often numbering in the thousands.

California and CDCA

Myotis velifer is found only in the Mule, Riverside and Whipple Mountain Ranges along the west bank of the Colorado River. Ken Stager (1939) and Vaughan (1959) found several mine tunnels in the Riverside Mountains occupied by large numbers of Myotis velifer, but these are no longer utilized.

HABITAT REQUIREMENTS

Deep mine tunnels and caves are used as roosts by the cave myotis, where they form extremely large colonies.

They cluster in the warmest portions of the roost, possibly for thermoregulation (Twente, 1955; Tinkle and Patterson, 1965). Twente (1955) also observed this clustering behavior during hibernation in Kansas caves. Stager (1939) found this bat present in the California mines only from April through August, although Denny Constantine has collected specimens as late as mid-November. This population possibly overwinters in Mexico.

Myotis velifer is the largest North American *Myotis*, and its flight is the most direct and least erratic of other members of the genus. In California, Vaughan (1959) watched these bats foraging over the floodplain of the Colorado River. They fly close to the vegetation, about six to fifteen feet above the ground depending upon the height of the vegetation. They have also been observed flying low over open water.

Cave myotis begin to forage around sunset and well before total darkness. They hunt until nearly midnight, at which time they hang up in a sheltered spot for the remainder of the night. An early morning foraging period is less clearly defined than for other species (Vaughan, 1959).

At present, two mine tunnels in the Mule Mountains and the Whipple Mountains are known to be used as maternity roosts by this species. A single young is born during the middle of June, and is nursed until three weeks of age. These roosts are shared by the leaf-nosed bat, *Macrotus californicus*, and *Myotis yumanensis*.

POPULATION STATUS IN THE CDCA

The numbers of Myotis velifer appear to be declining in the CDCA. The mine tunnels in the Riverside Mountains where Stager, Constantine, and Vaughan observed these bats twenty-five to forty years ago, at present shelter very few bats. The author has discovered the current roosts in the Mule and Whipple Mountains, and it is possible that more may be found. Seven years ago, vandals entered the mine in the Whipple Mountains and killed several bats. Since then, the population has declined. This bat is at the western extent of its range in the CDCA, and is more common further east in Arizona.

IMPACTS ON HABITAT

Any disturbance to the few remaining mine tunnels which serve as roosts for this bat might erradicate Myotis velifer in California. Since they forage extensively over the floodplain vegetation of the Colorado River, any destruction of this habitat would also have an adverse effect.

ONGOING STUDIES

Since 1968, the author has been monitoring the population of Myotis velifer in the mine in the Whipple Mountains. At present it numbers about three hundred bats (down from seven hundred in 1968), and the mine in the Mule Mountains houses approximately eight hundred bats.

ADDITIONAL DATA NEEDS

More exploration of mines along the Colorado River is necessary to locate additional roosts of this species in California. Mist-netting along the floodplain and across washes leading to the Colorado River may give information about the current distribution.

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DESERT PALLID BAT

Antrozous pallidus pallidus

SIGNIFICANCE

Although the coastal subspecies, *Antrozous p. pacificus*, is quite common, the smaller, paler desert subspecies, *Antrozous p. pallidus*, is relatively rare in the California desert but becomes more numerous east of the Colorado River. Studying past records, it appears to have been more common, and the population may be declining.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Four subspecies of *Antrozous pallidus* are recognized, ranging from the central plateau of Mexico northward into the southwestern deserts from Texas to California. Populations occur in Kansas and Oklahoma, and north along the West Coast into Oregon on both sides of the Cascade Range (Barbour and Davis, 1969).

California

The pallid bat occurs throughout California, being represented by two morphologically and geographically distinct subspecies -- the larger, darker coastal subspecies *Antrozous p. pacificus* and the smaller, paler desert race *Antrozous p. pallidus*. A few areas of sympatry exist such as around Sentenac Canyon and Agua Caliente Springs in Anza Borrego State Park. The coastal subspecies is locally common but appears sensitive to human disturbance.

DESERT PALLID BAT

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California

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CDCA

The desert pallid bat ranges throughout the California desert at elevations below 6,000 feet, with the majority of records from the mountains bordering the Colorado River. The author has located current roosting sites from Hole-in-the-Wall in the Providence Mountains, mines in the Cargo Muchacho, Mule, and Riverside Mountains, and in buildings in Coso Hot Springs.

HABITAT REQUIREMENTS

The pallid bat roosts in crevices in buildings, bridges, or rocks in groups of 10 to 100 individuals. In the desert, they wedge themselves tightly into rock crevices, often in mine tunnels. They are fairly sensitive to disturbance and will readily abandon a roost (Barbour and Davis, 1969). They prefer warmer temperatures, especially for maternity roosts, but not exceeding 38-40°C (Licht and Leitner, 1967). Between nightly foraging periods, pallid bats gather in more exposed shelters from which they can readily take flight. These roosts are often identified by piles of inedible insect remains littering the floor.

Pallid bats forage over desert scrub vegetation (mesquite, creosote and cat claw acacia) or grassland in search of ground arthropods, principally the Jerusalem cricket (Stenopalmatus) and scorpions, although occasionally beetles, grasshoppers and sphinx moths are taken (Engler, 1943; Orr, 1954; Ross, 1961). While searching for prey, pallid bats fly low and slow over the vegetation, often landing to pursue prey on the ground (Huey, 1936; Hall, 1946). They communicate while foraging via

audible sounds or "directives" (Brown, 1976).

Pallid bats hibernate over the winter in buildings in Nevada and northern California (Hall, 1946; Beck and Rudd, 1960), but no winter records have been reported from the California desert with the exception of two males mist-netted in the late November over Aqua Caliente Springs (T. McDonnell, pers. comm.).

During the spring, female pallid bats will congregate in maternity roosts which are usually in warm, inaccessible crevices. Here they give birth to twins in early June. The time of maternal care is longer than in most species, with the young continuing to nurse for seven weeks postnatally (Brown, 1976). During this period, they are especially vulnerable to disturbance.

POPULATION STATUS IN THE CDCA

The majority of records for the desert pallid bat are over thirty years old. The author has mist-netted this bat in recent years over Aqua Caliente Springs and Sentenac Canyon in Anza Borrego State Park, over Cottonwood Springs in Joshua Tree National Monument, over a pond in the Mule Mountains, over the water tank at Government Holes in the Mid Hills, and around the Coso Hot Springs. It appears that the population may be declining in CDCA, since many past roosts are no longer utilized by these bats.

IMPACTS

As with any bat species, disturbance to roosting sites especially during the breeding season will have an adverse effect on the pallid bat. Since this species has such specific food requirements

(i.e., Jerusalem crickets and scorpions), any activities, such as grazing, that would potentially affect this prey population could influence the pallid bat population.

ADDITIONAL DATA NEEDS

More areas of the CDCA need to be surveyed both for roost sites and foraging areas. Since they communicate in the audible range, they can be identified from vocalizations.

ONGOING STUDIES

The author has been studying population dynamics, foraging, and echolocation behavior in the pallid bat for the past ten years. Most of this research has been conducted in San Luis Obispo, Kern, and Napa Counties, and on Santa Cruz Island. Additional data has been gathered on the population at Aqua Caliente Spring by T. McDonnell.

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POCKETED FREE-TAILED BAT

Tadarida femorosacca

SIGNIFICANCE

This species is more common in Mexico, but only a few records exist for the California desert. Like Eumops, they prefer to roost in crevices on cliffs and may be limited by the availability of suitable roosts. Additional data is needed to assess its status in the CDCA.

GEOGRAPHICAL DISTRIBUTION

Worldwide

In the United States, the pocketed free-tailed bat has been taken from a dozen isolated localities in Lower Sonoran Life zones of California, Arizona, New Mexico, and the Big Bend of Texas. It is more common in Mexico, ranging at least as far south as Michoacan (Barbour and Davis, 1969).

California and the CDCA

The only records for this species in California are those of Phil Krutzsch (1944) for Suncrest and the Palm Canyon area of Anza Borrego, where 50 or 60 were observed roosting in a crevice in a cliff. An adult male was recently netted over Barker Dam Reservoir in Joshua Tree National Monument by John Cornell (pers. comm.).

HABITAT REQUIREMENTS

This bat occurs in the southwestern deserts where it roosts in rock crevices in high cliffs. The only known roost site for this species in California was a southwest facing cliff in Borrego Palm Canyon in Anza Borrego (Krutzsch, 1944). These bats drop from the roost before spreading their wings. Like other molossids, they are swift and direct in flight. They often produce audible calls while they are foraging and drinking over ponds (Benson, 1940).

A single young is born in late June. Gould (1961) observed a maternity colony under roof tiles in a building at the University of Arizona.

POPULATION STATUS IN THE CDCA

This bat is rare and at the northern and western extent of its range in the California desert. The roost site in Anza Borrego described by Krutzsch (1944) is no longer occupied and no current roosts are known. It may occasionally wander into California, as represented by the specimen mist-netted in Joshua Tree in 1977.

IMPACTS ON HABITATS

A proper crevice in a cliff face or high building seems to be a roost requirement for this species and may limit its distribution. Any disturbance of suitable roost sites would have an adverse impact.

ADDITIONAL DATA NEEDS

Mist-netting over desert waterholes in the southern CDCA may yield additional records of the pocketed free-tailed bat for California.

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FRINGED MYOTIS

Myotis thysanodes

SIGNIFICANCE

This bat has an irregular distribution throughout the western United States. It has been collected from five locations in the CDCA, all in the upper Sonoran life zone.

GEOGRAPHICAL DISTRIBUTION

Worldwide

This bat is locally common in western North America from British Columbia south to Veracruz and Chiapas and east to New Mexico and Colorado. It usually occurs at intermediate elevations of 4,000-7,000 feet in pinyon-juniper or oak woodland, but may occur at sea level on the West Coast (Barbour and Davis, 1969). I have found large colonies (500 or more individuals) in caves and mines around 4,000 feet in the Chiricahua Mountains of southeastern Arizona.

California

Myotis thysanodes is more common in northern California and the Sierra Nevada foothills, but it has been taken near the coast at Monterey and the Salinas Valley, and in the interior mountains of San Diego County. The largest roost of this bat in California (23 individuals) was found by Phil Krutzsch in a mine tunnel in San Diego County.

CDCA

The fringed myotis has been collected in five locations in upper Sonoran life zone in the CDCA, all above 4500 feet. These are Morongo Valley, Horse Spring in the Kingston Range, Mitchell's Caverns in the Providence Mountains, Government Holes in the Mid Hills, and Lower Covington Flat in Joshua Tree National Monument.

HABITAT REQUIREMENTS

This bat prefers roosting in caves and mine tunnels, but is occasionally found in buildings (Hoffmeister and Goodpaster, 1954; Maslin, 1938; Baker, 1962). Although no large colonies have been found in California, it is not unusual to find large roosts in caves in Arizona and New Mexico, often in association with Myotis velifer.

These bats generally forage among the trees in pinyon-juniper or oak woodland. Like other Myotis, they scoop up insects in their wing and tail membranes and transfer them to their mouth while in flight.

Almost all the records for this bat are from the summer months, and little is known of its winter habits.

POPULATION STATUS IN THE CDCA

The fringed myotis is known from only a few records in the CDCA, but it may be more common especially at higher elevations among pinyon-juniper in the desert mountains. No roosts of this species have been found in the California desert. More fieldwork is needed to accurately assess its status in the CDCA.

IMPACTS ON HABITAT

Since Myotis thysanodes forms large maternity roosts in mines and caves, any disturbance to these would constitute an adverse impact. No roost has yet been located for the CDCA.

ADDITIONAL DATA NEEDS

A survey of mine tunnels and caves in the higher desert mountain ranges such as the New York, Providence, Clark and Kingston Mountains may locate a roost of the fringed myotis. Mist-netting near water sources could verify its presence in an area.

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HOARY BAT

Lasiurus cinereus

SIGNIFICANCE

This beautiful bat is the most widespread bat in North America. It is migratory and solitary, and is seasonally common during the spring and fall in southern California. The few records for the desert are from this period.

GEOGRAPHIC DISTRIBUTION

Worldwide

The hoary bat is widespread throughout the western hemisphere, but it is nowhere abundant. It ranges from Alaska to Chile, and is the only bat found in all fifty states, including Hawaii. Because it undertakes long distance migrations, it has colonized several island groups, including Hawaii, the Galapagos, and Bermuda. It is seasonally common in California, New Mexico, and Arizona (Barbour and Davis, 1969).

California

Lasiurus cinereus ranges throughout California, and is generally encountered in the vicinity of trees. It is commonly found in Southern California from the fall through spring, often passing through in migratory waves (Vaughan and Krutzsch, 1954), and may overwinter here. During periods of migration, hoary bats have been taken on the Farallon Islands (Tenaza, 1966) and Channel Islands (Brown, 1980). From November 1976 to April 1977

fifteen specimens of the hoary bat were turned into the State Public Health Department from San Diego County (Denny Constantine, pers. comm.). Few records exist for the summer months, when they probably breed further north.

CDCA

All sixteen records for the CDCA are from the fall and spring periods of migration. They probably regularly wander across the desert, but cannot be considered to be resident. The records are scattered across the desert from near sea level at Thermal to over 6000 feet on Clark Mountain.

HABITAT REQUIREMENTS

The hoary bat prefers to roost in trees, and can be found in a wide variety ranging from desert cottonwoods and tamarisks to oaks and conifers. They generally choose a site well-concealed by foliage ten to fifteen feet about the ground (Constantine, 1966). They forage among trees, often near water, in search of insect prey (Poole, 1932; Dalquest, 1953). Orr (1950) reports seeing a hoary bat chasing a western pipistrelle, but there is no good evidence of them feeding on other bats.

Because of their large size, and swift direct flight, they are easily identified on the wing. They generally fly well after dark, but may emerge earlier during migration (Dalquest, 1943; Hall, 1946).

The sexes appear to migrate separately, especially in southern California (Vaughan, 1954; Vaughan & Krutzsch, 1954). In the summer, males are generally taken in the western states, with the females breeding further north (Findley and Jones, 1964; Dalquest, 1943). Females give birth to two young (Provost and Kirkpatrick, 1952; Poole, 1938) that are generally left clinging beneath leaves while the mother forages at night.

POPULATION STATUS IN THE CDCA

This bat is usually found in the CDCA during periods of migration, and is probably not a permanent resident. Its occurrence in the desert is random and unpredictable.

IMPACTS ON HABITATS

Since Lasiurus cinereus relies on trees for roosting, any cutting of desert trees could potentially affect the distribution of this species.

ADDITIONAL DATA NEEDS

Mist-netting over water holes and in the vicinity of trees during migratory periods could yield additional records for the CDCA.

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HOG-NOSED BAT

Choeronycteris mexicana

SIGNIFICANCE

There are no records of the hog-nosed bat from the California desert, but they are common in the Sonoran Desert to the southeast. It is possible that this bat occasionally may wander into the California desert.

GEOGRAPHICAL DISTRIBUTION

Worldwide

The hog-nosed bat is found from southeastern Arizona and southwestern New Mexico, south through Mexico and Central America to Venezuela (Barbour and Davis, 1969).

California

A September 1946 invasion resulted in 43 specimens from the vicinity of San Diego, where they were collected roosting under houses, patios, and in garages (Olson 1947; Huey 1954). This occurrence was probably due to mass disorientation during fall migration. Only one additional specimen was captured in San Diego in October 1963 (Banks and Parrish, 1965).

CDCA

No records exist for *Choeronycteris* in the CDCA. It is possible that the bat occasionally may wander into the southern desert when agaves are in flower.

HABITAT REQUIREMENTS

These bats normally inhabit the moist canyons of several isolated mountain ranges in southeastern Arizona and adjacent New Mexico during the warmer months. They migrate northward from Mexico to feed on the pollen and nectar of agaves and night-flowering cacti. Hog-nosed bats prefer to roost in mines and caves, but may occasionally use buildings (Hoffmeister and Goodpaster, 1954).

POPULATION STATUS IN THE CDCA

The hog-nosed bat is not known to occur in the CDCA.

ADDITIONAL DATA NEEDS

Since the hog-nosed bat feeds on agaves in its normal range, mist-netting near flowering agaves in the southern portion of the CDCA may produce some specimens.

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LITTLE BROWN BAT

Myotis lucifugus

SIGNIFICANCE

The little brown bat is probably the most abundant bat in North America, but it is not an inhabitant of arid regions. In Southern California, the only records are from higher elevations of interior mountain ranges.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Three subspecies of *Myotis lucifugus* occur in the United States. They range throughout Canada from the Arctic Circle southward throughout the United States, although they become increasingly rare in the southern tier of states and parts of the midwest. A disjunct population occurs in the southern high country of Mexico (Barbour and Davis, 1969).

California

The little brown bat is found throughout northern California and the Sierra Nevadas, but in Southern California only a few records exist for this bat from the San Bernardino Mountains above 6000 feet.

CDCA

Myotis lucifugus has not been taken in the CDCA, and the closest record is from Bodie, outside of the northern

HABITAT REQUIREMENTS

In the eastern United States, where it is most abundant, the little brown bat prefers to roost in manmade structures such as dark warm attics. Occasionally they are found in rock crevices and caves (Krutzsch, 1961). In the winter they seek out caves and mines as hibernaculum (Davis and Hitchcock, 1965). In the spring they form large maternity roosts in buildings.

They most often forage over water or near trees at heights of ten to twenty feet above the ground (Hough, 1957). They may follow a set hunting pattern as they circle among the trees (Humphrey, 1966).

POPULATION STATUS IN THE CDCA

Since this bat occurs north of the CDCA, any specimens that may be taken within the CDCA would be considered out of range. It is possible that vagrants may occur along the eastern scarp of the Sierra Nevadas.

IMPACTS ON HABITAT

Little brown bats frequently come into contact with man due to their habit of utilizing houses as roost sites. In the east, large numbers have been exterminated. In other areas, their numbers have declined in conjunction with pesticide usage.

ONGOING STUDIES

Because it is so common, several laboratories in the United States and Canada use *Myotis lucifugus* as the white rat of the bat world in studies ranging from auditory neurophysiology to the hormonal control of reproduction. Tom Kunz, Brock Fenton and their students study population dynamics and foraging strategies.

ADDITIONAL DATA NEEDS

Mist-netting near waterholes in the northern CDCA and along the eastern foothills of the Sierra Nevadas may yield specimens of *Myotis lucifugus*.

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LONG-EARED MYOTIS

Myotis evotis

SIGNIFICANCE

Myotis evotis ranges throughout the western United States, but is nowhere common. It is usually found at higher elevations in coniferous forests. Only two records exist for the California desert.

GEOGRAPHICAL DISTRIBUTION

Worldwide

The long-eared myotis ranges throughout the mountains of the western United States and Canada. Among West Coast forests, it is found at sea level. One specimen exists from desert scrub at Comondu, Baja California (Barbour and Davis, 1969).

California

Myotis evotis is more common in northern California and the Sierra Nevadas. A few specimens exist for the eastern Sierra foothills and the White Mountains above 6,000 feet. Several specimens are from San Diego County. The author has netted this bat in coastal sage scrub in eastern San Diego County at 2,800 feet, but most records are for higher elevations.

CDCA

The only desert specimens of Myotis evotis were collected by Phil Krutzsch at Vallecito in the western edge of the Anza

Borrego desert. Several records from Walker Pass are outside the CDCA as is the one from Tollhouse Spring in the White Mountains.

HABITAT REQUIREMENTS

Little is known about the life history of Myotis evotis despite its widespread distribution. It has been found roosting in buildings and under the bark of trees, and occasionally in caves (Davis, 1939; Albright, 1959).

It forages late in the evening and has been netted by Barbour and Davis (1969) over ponds in coniferous forest but never in large numbers. They may utilize caves as night roosts.

POPULATION STATUS IN THE CDCA

This bat is rare in the CDCA. The few records that exist may represent individuals wandering outside of normal habitat, since Myotis evotis is usually considered to be a bat of forested areas. More information is needed to accurately assess its present status.

IMPACTS ON HABITAT

Since so little is known of the life history of this bat and its habitat requirements, more research is necessary to predict any adverse impacts on the population.

ADDITIONAL DATA NEEDS

Mist-netting over desert water sources at higher elevations, particularly near the Sierra Nevadas, may yield more records of Myotis evotis.

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LONG-LEGGED MYOTIS

Myotis volans

SIGNIFICANCE

Although this bat is typically a resident of the Transition and Canadian life zones, it occasionally wanders into the California desert, where it is taken over water holes. No roosts have been found in the CDCA.

GEOGRAPHICAL DISTRIBUTION

Worldwide

This bat occurs in western North America from Alaska to Veracruz, Mexico, ranging from the West Coast east to the Rockies, with isolated populations in Nebraska and the Dakotas. It appears to favor forested areas in the Transition and Canadian life zones.

California

Myotis volans ranges throughout California but is more common in forests to the north. Most records are from above 4,000 ft., although it occurs at sea level along the coast.

CDCA

Only ten records exist in the CDCA, all from upper Sonoran life zones. Most of these records are over seventy years old. In the fall of 1978, the author mist-netted four Myotis volans over Haiwee Springs in the Coso Range. No roosts of this species have been found in the desert.

HABITAT REQUIREMENTS

Myotis volans prefers to roost in buildings and rock crevices (Dalquest and Ramage, 1948; Quay, 1948; Davis, 1960), although they have been taken from beneath the loose bark of trees in Mexico (Baker and Phillips, 1965). They form very large maternity roosts in the spring.

They forage for insects in riparian situations generally about ten to fifteen feet above the water (Dalquest, 1948). Their flight is less erratic than some of the other Myotis. Although they are generally not found in caves and mines during the day, they have been found night roosting in a mine in Arizona (Barbour and Davis, 1969).

POPULATION STATUS IN THE CDCA

With only ten records from the CDCA, it is difficult to assess the status of Myotis volans. It is probably not a resident of the desert, but like several other species will occasionally wander into desert riparian situations. No roosts of this bat are known in the CDCA.

IMPACTS

Until the status of Myotis volans is known in the CDCA and roosting sites are located, it is impossible to determine what are the potential impacts upon the population.

ADDITIONAL DATA NEEDS

As for many of the bat species, mist-netting of desert waterholes and a survey of potential roosts is necessary to

determine the status of this bat in the CDCA.

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MEXICAN FREE-TAILED BAT

Tadarida brasiliensis

SIGNIFICANCE

In many areas of the Southwest, Mexican free-tailed bats form large colonies numbering in the thousands. Due to the great fecal accumulation in the roosts, it is also known as the guano bat. Throughout its range, including California, its numbers are declining, probably due to pesticide usage.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Tadarida brasiliensis occurs from northern South America, north through Central America and the Caribbean Islands into North America, across the southern tier of states from California to South Carolina. It reaches the northern extent of its range in southern Oregon, Nevada, Utah, Colorado, Kansas, Arkansas, the Gulf Coast states, and South Carolina. The southeastern subspecies, Tadarida brasiliensis cynocephala, is nonmigratory and lives in buildings, while Tadarida brasiliensis mexicana from Southwestern caves is migratory (Barbour and Davis, 1969).

California

The Mexican free-tailed bat is found throughout California from sea level to over 9,200 feet, but usually it inhabits the lower and upper Sonoran life zones. The population in

northern California and the Central Valley is resident year-round, while those from the desert appear to migrate in the winter months (P. Leitner, pers. comm.). In southern California their numbers are declining. Thirty-five years ago, Phil Krutzsch (pers. comm.) found thirty free-tailed bat roosts in San Diego County, none of which are now active.

CDCA

Scattered records exist for the Mexican free-tailed bat from the CDCA, from sea level near the Salton Sea to 7,300 feet at Panamint City. The majority of the specimens are from the Imperial and Coachella Valleys and along the Colorado River. As in coastal areas, the numbers appear to be declining. A large colony discovered by Stager thirty years ago at Bat Cave Buttes on the east side of the Salton Sea no longer exists. The largest known colony at present is in the County Services Building in El Centro.

HABITAT REQUIREMENTS

Tadarida brasiliensis inhabits caves throughout Texas and the Southwest, where it forms extremely large colonies. However, in California, with the exception of the desert, it roosts principally in buildings (Krutzsch, 1955). In the California desert, the author has found this bat in mine tunnels, but never in large numbers, in addition to under bridges and in buildings.

Mexican free-tailed bats have long, narrow (high aspect ratio) wings that adapt them for rapid flight. They are easily identified as they forage swiftly high above the ground, often above the tree canopy (Constantine, 1967). The population at Carlsbad Caverns travels forty miles to feed over the Pecos River Valley. In the California desert, they appear to forage over agricultural areas in the Imperial and Coachella Valleys and along the Colorado River. They appear to feed almost entirely on small moths (Storer, 1926; Ross, 1961). In California, Krutzsch (1955) noted that, unlike most other species, they are not found night roosting and may remain on the wing all evening, returning to the day roost at dawn. This is often the case in the large Texas bat caves in which the nightly exodus and dawn re-entry flights last for several hours. The bats frequently reach speeds of 60 miles per hour while exiting, and as much as 80 miles per hour upon entering the cave (Davis _et_ _al_., 1962).

The largest colonies of _Tadarida_ are maternity roosts. In California, Krutzsch (1955) found few adult males in these roosts in the late spring and summer. _Tadarida_ is one of the few bat species in which the mother will nurse young other than its own (Davis _et_ _al_., 1962). This is possibly due to the large colony size and the difficulty of locating an individual baby among thousands.

POPULATION STATUS IN THE CDCA

Except for occasional records, the free-tailed bat population has declined in the CDCA. At one time it was fairly common

near agricultural areas of the Imperial and Coachella Valleys and along the Colorado River. Ten years ago, the author found them roosting in a mine tunnel in the Riverside Mountains, but this colony no longer exists. Currently, the only desert roost known to the author is in the County Services Building in El Centro, but this is destined to be exterminated due to the report of a rabid bat found nearby. This has been the fate of other free-tailed bat colonies.

IMPACTS ON HABITAT

Other than the deliberate removal of bats from buildings for disease and pest control, the most serious threat to the free-tailed bat is pesticide use which directly poisons the bats and also reduces their insect food supply. Free-tailed bats accumulate fat prior to migratory flights, and fat-soluble pesticide residues are rapidly metabolized during these flights, thereby poisoning the bat.

ADDITIONAL DATA NEEDS

A survey of potential roost sites is needed to assess the population status of *Tadarida* in the CDCA. Free-tailed bats seldom are captured in mist nets, so this is a less effective means of sampling an area for this species.

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SILVER-HAIRED BAT

Lasionycteris noctivagans

SIGNIFICANCE

The silver-haired bat is an inhabitant of forests in the northern United States. It is migratory and solitary. The few records for southern California are from late spring and early fall, suggesting it may wander outside its normal range during migration.

GEOGRAPHICAL DISTRIBUTION

Worldwide

This species is found across Canada south of the Arctic Circle and throughout the United States, except for Florida. It is primarily an inhabitant of northern forests and enters the southern states principally during fall migration (Barbour and Davis, 1969).

California

This bat is most common in the northern half of the state and the Sierra Nevadas. Six records exist for the California desert. The author mist-netted a solitary male on Santa Cruz Island during a fall period of Santa Ana winds, suggesting it may have been blown off course during migration.

CDCA

All the records for the CDCA are from late fall and early spring, which coincide with the migratory period of the

silver-haired bat. Two specimens were netted by T. McDonnell (pers. comm.) at Aqua Caliente Springs in the Anza Borrego Desert, and one each was taken at Furnace Creek Ranch in Death Valley, Chris Wicht Camp in the Panamint Range, Haiwee Springs in the Coso Range, and Victorville.

HABITAT REQUIREMENTS

Since this is a migratory species, it occupies different habitats and geographical areas depending on the season, and can become locally abundant during migratory periods. They breed in the far north almost up to the tree line. Males are generally encountered in the southwestern mountains during the winter months, suggesting that the sexes segregate for most of the year.

Lasioncyteris typically roosts in tree hollows and beneath loose bark. Occasionally they are found in caves (Krutzsch, 1966), mines (Pearson, 1962), and rock crevices (Frum, 1953). They have been found hibernating in mines, rock crevices, trees, and buildings (Pearson, 1962; Barbour and Davis, 1969).

This bat forages within twenty feet of woodland ponds and streams (Hamilton, 1943), and due to its size and slow flight pattern is easily identified.

POPULATION STATUS IN THE CDCA

This bat occurs in the California deserts only during migration and cannot be considered a resident.

IMPACTS ON HABITATS

Since the occurrence of this bat is unpredictable, it is difficult to determine what impacts if any exist in the CDCA. Within its normal range, destruction of hollow trees which serve as roosts would have an adverse effect.

ADDITIONAL DATA NEEDS

Mist-netting over water holes, especially in the northern portions of the CDCA during the fall through spring, may furnish additional records of Lasionycteris.

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SMALL-FOOTED MYOTIS

Myotis leibii (a.k.a. subulatus)

SIGNIFICANCE

This bat has a spotty distribution across the United States. In areas of sympatry such as the California desert it is easily confused with Myotis californicus. About a dozen records exist for the CDCA in a variety of habitats above 3000 feet.

GEOGRAPHICAL DISTRIBUTION

Worldwide

This species is most common in the western United States, ranging from Canada south to Chihuahua. There are several disjunct populations across the central United States, with a nearly continuous distribution in the northeast and south into northern Georgia. Throughout their range they occupy a wide variety of habitats (Barbour and Davis, 1969).

California

The small-footed myotis is most commonly found in the Sierra Neveda foothills and along the coastal ranges and valleys south of Monterey. Several records exist for San Diego County. It is absent from the low desert and northern coastal areas.

CDCA

Myotis leibii has been reported from a dozen scattered locations in the California desert. It is absent from the lowest, hottest

parts of the desert with the exception of a record from Mecca. Several records exist for Anza Borrego State Park. No roosts have been discovered for this bat in the CDCA.

HABITAT REQUIREMENTS

Like its close relative, Myotis californicus, Myotis leibii roosts singly or in small groups, often in buildings (Koford and Koford, 1948; Hitchcock, 1955), although they have also been found under rock slabs (Davis, 1955; Tuttle, 1964).and beneath tree bark (Jones, 1964). They will utilize buildings and caves for night roosts (Krutzsch, 1966).

The author has mist-netted this species in several habitats over water sources in San Diego County. Recently, several individuals were taken over Haiwee Springs in the Coso Range. Their behavior in flight is similar to M. californicus, and they forage near or over water with a slow erratic flight. Almost all of the records for southern California are from the summer, and little is known of their winter range.

POPULATION STATUS IN THE CDCA

Since only a few records from widespread localities exist for this species in the CDCA, it is difficult to assess its status. Since it can be easily confused with Myotis californicus, it may be more common due to misidentification of some specimens. No roosts of this bat in the CDCA have been located.

IMPACTS ON HABITATS

Since so little is known of the distribution and habits of this bat in the CDCA, it is difficult to assess which impacts are important.

ADDITIONAL DATA NEEDS

As for other species, mist-netting over desert waterholes and a survey of potential roosting sites is necessary to determine the status of the small-footed myotis in the California desert.

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SPOTTED BAT

Euderma maculatum

SIGNIFICANCE

The spotted bat is the rarest of North American bats, and little is known of its life history. From the time it was first captured in 1891 until 1965 only 35 records were reported which has resulted in its being listed as rare in the Bureau of Sport Fisheries and Wildlife Rare and Endangered Species List of 1968 and in the Red Data Book (Watkins, 1977). Since then more specimens have been reported, mainly from south Texas (Easterla, 1973).

GEOGRAPHICAL DISTRIBUTION

Worldwide

Most specimens of the spotted bat are from the southwestern United States in Nevada, California, Arizona, New Mexico and west Texas in habitats ranging from low desert to coniferous forest. Isolated northern records also exist from Idaho, Utah, Wyoming, and Montana. In Mexico specimens have been taken in the states of Durango and Quintaro (Handley 1959; Constantine 1961; Gardner 1965; Easterla 1965; 1970; Medeiros and Heckmann 1971; Jones 1965; Findley and Jones 1965; Schmidly and Martin 1973; Stager 1957; Hall 1935; Benson 1954; and Parker, 1952).

California

The type specimen of the spotted bat was collected near Castaic Creek, Piru, Ventura County (Allen, 1891) in oak woodland. Subsequent records have ranged altitudinally from the upper Transition Zone in Yosemite National Park, Mariposa County (Ashcraft, 1932) to below sea level at Mecca, Riverside County (Grinnell 1910). It is therefore very difficult to predict a typical habitat for this bat.

CDCA

Four specimens of the spotted bat exist from the California desert in creosote bush scrub habitat: China Lake and Red Rock Canyon at 3000 feet, 29 Palms at 2000 feet, and below sea level at Mecca. All of these specimens were dead or in a moribund condition when collected. No additional spotted bats have been taken in California since the 1956 record from China Lake.

HABITAT REQUIREMENTS

The spotted bat has been taken in a wide variety of habitats. From the few records available, it appears that at least in early summer this bat is a resident of ponderosa pine forests at elevations of 6000 - 8000 feet (Barbour and Davis, 1969). Late summer and early fall records are from lower elevations, suggesting possible migration. During the summer Easterla (1973) netted 54 _Euderma_ in a rocky canyon in the Lower Sonoran Life Zone

of the Chihuahuan Desert in Big Bend National Park, Texas. He had observed these bats to enter in horizontal rock crevices in high cliffs. The majority of the bats were taken late at night from rough desert terrain, similar to the preferred habitat of the spotted bat's close relative, the big-eared bat Plecotus townsendii. Forty-nine of the 54 bats captured by Easterla (1973) were taken after midnight. Analysis of fecal material (Ross 1961) and stomach contents (Easterla 1965; Easterla and Whitaker 1972) suggest that these bats feed entirely on moths.

Almost nothing is known of their reproductive biology although lactating females have been netted in New Mexico from June 23 to July 9 (Findley and Jones, 1965), and Utah from August 10 - 18 (Easterla, 1965). Easterla (1971) reported a pregnant female netted in Big Bend that gave birth to a single young on June 11.

POPULATION STATUS IN THE CDCA

Since so few records exist for the spotted bat in the California desert, it is difficult to assess its status at this time other than to say that it is certainly rare. Since this bat occurs in low desert scrub in Big Bend National Park it could turn up anywhere in the CDCA as well.

IMPACTS

Until more is known about the habitat requirements of the spotted bat in the CDCA, it is not possible to predict what activities will have an unfavorable impact.

ADDITIONAL DATA NEEDS

As for many other bat species, extensive mist netting, particularly around desert waterholes, is needed to ascertain the range and habitat preference of the spotted bat in California.

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Tadarida brasiliensis

(Mexican free-tailed bat)

Populations have declined throughout the southwest due to pesticide usage. This also appears to be the case for the CDCA, where in the past *Tadarida* was locally abundant in the Coachella and Imperial Valleys and along the Colorado River. Pesticides directly affect the bats and also serve to reduce their food supply. A colony in the Imperial County Services Building in El Centro is destined to be exterminated due to the report of a rabid bat. This has been the fate of other free-tailed bat colonies. Mist netting and a survey of potential roost sites in the CDCA is needed to assess the population status.

Eumops perotis

(Western mastiff bat)

No new records of this bat have been obtained within the past twelve years. Although at one time fairly common in southern California, the population has definitely declined, through roost destruction, vandalism, and probably pesticides. This is the case throughout the southwest deserts, although only six specimens are known from the CDCA. More data is needed particularly on the availability of suitable roost crevices which are a limiting factor for this species.

Antrozous p pallidus

(Desert pallid bat)

Although the coastal subspecies, Antrozous p pacificus is quite common, the smaller paler desert subspecies is relatively rare but becomes more numerous east of the Colorado River. The area around Sentenac Canyon and Agua Caliente Springs in Anza Borrego Park is a region of subspecific sympatry, and therefore is quite interesting. In the CDCA, pallid bats roost in rock crevices and mines, and several past roost sites are no longer utilized. The population appears to be declining, and additional studies are needed.

Macrotus waterhousii californicus

(California leaf-nosed bat)

This bat is locally abundant in about ten mine tunnels along the Colorado River where it forms colonies of several hundred bats. There are only isolated records farther west in the CDCA. These bats have specific roost requirements for warm, humid mines with fairly high ceilings. Only a few maternity roosts are known for California, and care should be taken so that these roosts are not disturbed through vandalism or mining activity.

Plecotus townsendii

(Lump-nosed bat)

This bat is locally common in the CDCA, and is fre-

quently mist-netted over desert water holes. However, it is extremely sensitive to human disturbance at roosts. A single visit to a mine tunnel can cause it to be abandoned. This makes it particularly vulnerable to human disturbance, and also very difficult to study. It is also tied to water sources, and any impact on these will adversely affect the population. They are frequently encountered in the winter, hibernating in mine tunnels singly or in pairs, and should not be disturbed.

Myotis velifer

(Cave myotis)

This bat is restricted to the mountain ranges along the Colorado River in the CDCA, and is more common farther east. Many mine tunnels occupied in the past are no longer used and the population appears to be declining in the CDCA. The population is now concentrated in only two mine tunnels, each with several hundred bats. This makes them quite vulnerable to disturbance.

Myotis thysanodes

(Fringed myotis)

This bat has an irregular distribution and is locally common throughout the southwest. Only five specimens exist for CDCA, all from the Upper Sonoran life zone.

No roosts have been discovered, and more mist-netting is necessary to accurately assess its status.

Myotis volans

(Long-legged myotis)

This bat is most commonly found at elevations above 4000 feet in the western United States. Ten records exist for the CDCA, all from the Upper Sonoran life zone, but no roosts have been found. Further studies are needed to assess its status.

Myotis leibii

(Small-footed myotis)

This bat is easily confused with *Myotis californicus* in areas of sympatry such as the CDCA. It has a spotty distribution throughout the U.S. and little is known of its life history. About a dozen records exist for the CDCA in a variety of habitats, but no roosts have been found. Further studies are necessary to determine the population status.

Myotis evotis

(Big-eared myotis)

This bat is widespread throughout the western United States, but is nowhere common, and little is known of its life history. Only two records exist for CDCA, and it

is difficult to assess its status without further studies, including mist-netting over water at elevations above 3000 feet in the CDCA.

Eptesicus fuscus pallidus

(Big brown bat)

These bats are frequently encountered in mine tunnels and old buildings. They are more tolerant of intrusion than most bat species. Though less common in the CDCA than along the coast, the population appears stable.

Tadarida femorosacca

(Pocketed free-tailed bat)

This bat is more common south in Mexico, but a few records exist for the CDCA including a small colony in the crevice of a cliff in Anza-Borrego, and one mist-netted recently over Barker Reservoir in Joshua Tree National Monument. Like *Eumops*, they may be limited by the availability of suitable roosts. Additional studies, including mist-netting over water holes are needed to assess its status accurately in the CDCA.

Euderma maculatum

(Spotted bat)

Because it is rare throughout its range in the southwest United States, it has been listed as *rare* on the Red

in a dead or moribund condition, and without mist netting studies it is impossible to assess its status.

Lasiurus ega

(Western yellow bat)

All records for this bat in the CDCA are from the vicinity of palm trees, where they probably roost. The bat is more common further south in Mexico, and the specimens taken in California were during migration when yellow bats may wander northward. Mist-netting studies are necessary to determine the population status of this bat in the CDCA.

Lasiurus cinereus

(Hoary bat)

This is the most widespread North American bat, occurring in all fifty states. They are seasonally common in southern California, passing through southern California in migratory waves during the spring and fall. All sixteen records for the CDCA are during times of migration, and they do not appear to be resident. These bats breed further north and roost in trees. Mist netting over water holes and in the vicinity of trees during migration should yield additional records.

Lasionycteris noctivagans

(Silver-haired bat)

Like the hoary bat, the silver-haired bat is solitary and migratory. Its normal range is in the forests of the northern United States. A few records exist for southern California, including five in the CDCA, two from Agua Caliente Springs and one each from Furnace Creek, Chris Wicht Camp and Haiwee Springs. All were taken during early spring or late fall, suggesting that it may wander outside its normal range during migration. Extensive mist-netting over water holes during these periods will probably furnish additional records in the CDCA.

Myotis yumanensis yumanensis

(Yuma myotis)

This bat is fairly common throughout southern California below 8500 feet. This bat is almost always found near permanent water sources, being expecially common in the CDCA along the Colorado River where it roosts in mine tunnels and forages among tamarisks and cottonwoods.

Myotis californicus stephensi

(California myotis)

This is the most common myotis in the CDCA. They roost singly or in small groups in mine tunnels, buildings, and rock crevices, and are commonly captured in

mist nets over desert water sources.

Pipistrellus hesperus

(Western pipistrelle)

This is the smallest bat in North America and also the most abundant bat in the CDCA. They roost singly in rock crevices, commonly emerging before sunset. They are easily mist-netted over water holes, and are often active during warm winter evenings.

Choeronycteris mexicana

(Hog-nosed bat)

No records exist for this bat in the CDCA, although 43 specimens were taken during a fall 1946 invasion of San Diego. This bat normally occurs further south in Mexico where it feeds on the nectar of agaves and night-flowering cacti. It is possible they may wander into the CDCA during the time of agave flowering.

Myotis lucifugus

(Little brown bat)

This bat is a common bat throughout the northern United States but the only records for southern California are from higher elevations in interior mountain ranges. One record exists for Bodie outside of the northern

boundary of the CDCA. It is possible that this bat may wander into the CDCA along the eastern Sierran foothills.

Myotis occultus

(Arizona myotis)

This bat is more common east of the Colorado River, but several older records exist on the California side of the river from Blythe to Ft. Yuma. No specimens have been taken since 1945, and the status in the CDCA is unknown at present. Mist-netting and a survey of roosts along the Colorado River is needed to determine if this bat still occurs in California.

WESTERN BIG-EARED BAT OR LUMP-NOSED BAT

Plecotus townsendii

SIGNIFICANCE

Plecotus is locally common in the California desert and is frequently encountered roosting singly or in small groups in mine tunnels and caves. However, it is extremely sensitive to human disturbance and will quickly abandon a roost. It is one of the few species found hibernating during the winter in the CDCA.

GEOGRAPHICAL DISTRIBUTION

Worldwide

This species is most frequently found along the West Coast and throughout the Southwest at elevations from sea level to 10,000 feet in a wide range of geographical and ecological situations. It is found throughout western North America from British Columbia south to Oaxaca and east to the limestone caves of central Texas. Isolated populations are found in caves of Kansas, Oklahoma, Texas, Arkansas, Missouri, Kentucky, West Virginia and Virginia (Barbour and Davis, 1969).

California

The lump-nosed bat is found throughout California in habitats ranging from desert scrub to coniferous forests where it is most frequently found roosting in caves and abandoned mine tunnels. A large colony occupied an abandoned building on

Santa Cruz Island before it was disturbed by collectors.

CDCA

This species is widespread throughout the California desert at elevations from near sea level along the Colorado River to over 8,000 feet in the Panamint Range.

HABITAT REQUIREMENTS

The most important requirement for a roost for this species is that it be free of human disturbance. A single visit can cause a roost to be abandoned. Throughout most of its range, Plecotus is most frequently found roosting in caves (Graham, 1966). In the desert, it often utilizes mine tunnels, while in areas where caves and mines are absent, it will roost in buildings (Dalquest, 1947; Pearson et al., 1952). Unlike most species of bats, it does not enter crevices, but rather hangs by one foot from the ceiling. During daily torpor and hibernation, the long ears are tightly curled, possibly to prevent heat loss.

Males usually roost separately throughout the year, but in the late spring the females gather together to form large maternity colonies, with the young being born in late may or early June (Pearson et al., 1952). In the desert these roosts are generally within the first hundred feet of mine tunnels, but in other areas they use natural caves and buildings. They are particularly sensitive to

human disturbance at this time. Graham (1966) states that due to human activity, no nursery colonies now exist in California caves.

Plecotus begins to forage only after dark, preying almost entirely on moths (Hamilton, 1943). They can dart rapidly about, but are also agile fliers capable of hovering to glean moths from the foliage (Handley, 1959). They are not often taken in mist nets and appear to actively avoid them (Cockrum and Ordway, 1959).

In the winter, the lump-nosed bat is frequently found hibernating singly or in small groups in desert mine tunnels. They usually hang near the entrance of the mine where the air is cooler, but far enough back to avoid freezing temperatures (Pearson et al., 1952). During the summer months in the same mine tunnel, the bats will inhabit deeper portions which remain at the annual mean temperature; females tend to roost in cooler spots than males and arouse less frequently. During hibernation they are also intolerant of disturbance and will leave their roost in mid winter.

POPULATION STATUS IN THE CDCA

The lump-nosed bat is fairly common and widespread in the CDCA, but the population appears to be declining. They no longer occupy many of the roosts that they did thirty years ago. This is at least in part due to human disturbance and collecting.

IMPACTS ON HABITAT

The most serious threat to this species is human disturbance of roost sites. Once a colony is discovered, great care should be taken not to enter the roost. This is especially important for maternity roosts and hibernaculum. Since large numbers of females cluster in nursery colonies, a single visit can have a great impact.

ADDITIONAL DATA NEEDS

It is difficult to study roosts of this species without disturbing them. However, mist-netting over desert water holes occasionally yields a lump-nosed bat and can furnish information on range and population density.

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WESTERN MASTIFF BAT

Eumops perotis

SIGNIFICANCE

The western mastiff bat is the largest North American bat. Although it was never common, in the past several colonies were known to exist in southern California. However, none of these roosts is currently occupied and many have been destroyed. No specimens have been taken in over twelve years, and the population in California appears to have declined and may be endangered.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Several subspecies of *Eumops perotis* occur in three disjunct populations. One ranges through South America from Argentina to Peru and northern Brazil; another occurs in Cuba; the third has its northern limit in San Francisco, California, cutting diagonally across the state in the Upper and Lower Sonoran life zones to southern Nevada and Arizona. It apparently skips New Mexico, but occurs in the Big Bend region of west Texas and across northern Mexico from Sonora to Coahuila (Barbour and Davis 1969, Cockrum 1960).

California

In California the mastiff bat is known from a few speci-

mens in the San Francisco Bay region, south along the coast ranges and Central Valley and southern Sierra foothills near Lake Isabella. The majority of records are from the Los Angeles and San Diego areas, with a few from the south central desert (Howell 1920, Krutzsch 1955).

CDCA

Only six records exist for the CDCA - four are from creosote bush scrub near sea level in Mecca, Coachella, Palo Verde, and the west side of the Salton Sea, while two from Anza Borrego desert are from slightly higher elevations of about 1500 feet.

HABITAT REQUIREMENTS

A suitable roost site is the most critical requirement for this species. The mastiff bat prefers to roost in tight crevices in vertical cliff faces or buildings that are at least one foot deep, two inches wide, and at least 20 feet above the ground. Their long narrow wings enable them to be high swift fliers, but reduce their maneuverability, hence they must drop 10-20 feet before launching themselves into level flight. The entrances to the roost are always horizontal and face downward, so the bats simply leave by dropping out. However the back of the crevice must be narrow enough for the bats to wedge themselves in (Vaughan, 1959).

Most natural roost sites occur in rugged rocky canyons in the Upper and Lower Sonoran life Zones below a 3000 foot elevation. Sandstone and granitic outcrops provide ideal roosts, since they flake upon weathering and form deep crevices. Man-made structures, particularly in southern California have been utilized by Eumops (Howell, 1920), although no current sites of this type are known.

Eumops emits a loud distinctive call which serves to identify this species in flight. Vaughan (1959) has observed them flying to heights of 1000 feet after leaving the roost. Their high swift flight enables them to cover a wide area while foraging, and Vaughan (1959) has heard them flying at elevations of 100 to 200 feet over the Mohave Desert more than 15 miles from the nearest hills that would afford them a roosting site.

The mastiff bats emerge only after complete darkness and may spend as many as 6½ hours a night foraging for insects, primarily Hymenoptera (Vaughan 1959; Ross 1961). They usually do not return to the roost until after midnight, and seldom utilize night roosts (Cockrum, 1960).

Most colonies in California contain less than 100 bats with both sexes occupying the same roosts (Krutzsch 1955; Howell 1920). These roost sites usually change seasonally, although Leitner (1966) found an attic in Glendora, California occupied year round.

POPULATION STATUS IN THE CDCA

Although at one time fairly common in California, no colonies are known at present. While writing "Bats of America," Barbour and Davis (1969) tried unsuccessfully to obtain a live specimen from California, finally catching one on Eagle Creek in Arizona. Within the CDCA per se, the population, although never high, has been drastically reduced, with the last specimen being taken in 1967.

IMPACTS ON HABITAT

Roosting sites appear to be the most critical requirement for the mastiff bat. Within urban areas, the destruction of buildings utilized as roosts has abolished some colonies, while other natural and man-made roosts have simply been deserted. In several instances vandals have shot emerging bats, since the odor and sound from *Eumops'* roosts attract attention. Populations of mastiff bats are declining in other parts of their range, and this is true for other molossids such as *Tadarida brasiliensis*. These bats appear to be quite sensitive to pesticides, and several studies are currently in progress to assess the full impact.

ADDITIONAL DATA NEEDS

In order to assess the status of the mastiff bat in the

CDCA, a thorough search for roosting sites is needed since they are a limiting factor. Suitable sites not being utilized by _Eumops_ should be noted as well as those that are. _Eumops_ is readily taken in mist nets, but only over large pools with plenty of space for approach, due to the bat's poor maneuverability.

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YUMA MYOTIS

Myotis yumanensis

SIGNIFICANCE

The Yuma myotis is fairly common throughout California below 8500 feet. This bat is almost always found near permanent water sources.

GEOGRAPHICAL DISTRIBUTION

Worldwide

Myotis yumanensis occurs throughout western North America from British Columbia to central Mexico. It ranges as far east as the Big Bend of Texas, but is most common in the Pacific states. It is closely related to *Myotis lucifugus* and may hydridize in areas of sympatry (Harris and Findley, 1962).

California

Four subspecies of Yuma myotis are recognized in California. All occur at elevations below 8500 feet and usually near permanent water.

CDCA

Myotis yumanensis yumanensis is found throughout the California desert, but most records are from along the Colorado River. The current roosts known to the author

are in the Mule and Riverside Mountains near the Colorado River, where the bats forage among the cottonwoods and tamarisks over the floodplain.

HABITAT REQUIREMENTS

In the desert, Myotis yumanensis roosts in rock crevices and mines. In the Mule Mountains, the Yuma myotis share their mine tunnel with Macrotus californicus and Myotis velifer, with which they roost in close proximity. They utilize old buildings and bridges in other areas, often roosting in association with Antrozous and Tadarida. The maternity roosts are located in buildings where temperatures reach 50°C (Licht and Leitner, 1967).

They almost always seem to forage in riparian situations, dipping to drink between insect pursuits (Dalquest, 1947). Barbour and Davis (1969) consider them to be more closely associated with water than any other species of North American bat.

POPULATION STATUS IN THE CDCA

The Yuma myotis has an uneven distribution in the CDCA, since it occurs mainly near permanent water sources. It is quite common in the mountain ranges bordering the Colorado River.

IMPACTS ON HABITATS

Any disturbance to desert riparian habitat, either through fouling of the water source or destruction of vegetation,

will have an adverse impact on the Yuma myotis. Since they form very large maternity roosts, they are particularly vulnerable during this period.

ADDITIONAL DATA NEEDS

At present, only one maternity roost is known for this species in the CDCA. Since it is necessary to protect these roosts, additional fieldwork is needed to locate them. Mist-netting near desert water holes will give a better indication of the distribution of this bat in the desert.

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COMMON NAME California leaf-nosed bat

SCIENTIFIC NAME Macrotus californicus

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
	Rio Co										
3-5-77	Stone House Mine Mule Mtns	8S	21E	34	W½	800'	LS roost creosote	>7			S. Lacey
7-27-77	" "	"	"	"	"	"	LS roost creosote	3 2	A	♂ ♀	P Brown
" "	Quarry Pond Mule Mtns	"	"	"	E½	500'	mistnet LS "	1 8	A	♀ ♂	" "
7-28-77	Roosevelt Mine-Mule Mtns	8S	21E	7	NW¼	800'	maternity roost LS creosote	~250			"
"	"						" Banded		20 104	J ♀ A ♂	"
"	"						"		18 22	A ♂ J ♂	" "
7-29-77	Desan Mine Chocolate Mtns	11S	21E	18	SE	1000'	maternity roost LS creosote	~500			" "
"	"	"	"	"	"	"	" "	2	A	♂	" "
7-30-77	Golden Crown Mine Cargo Muchacho	15S	20E	1		1000'	roost LS creosote	1	A	♂	" "
7-31-77	Sidewinder Mine Russian Gulch, Cargo Muchacho	15S	2?E			1000'	Roost LS creosote	2	A	♂	" "
~~[illegible]~~											
	San Diego Co										
7-9-77	Barrett Honey Flume	18S	3E	8	NW	1500'	US roost Chapparal	50	A	♂	P. Bro
7-11-77	Mine Canyon	18S	2E	21		1500'	oak woodland US	1	mummified A	♂	"
2/78	Santa Margarita Ranch							18	A		H.W. Grinnell

COMMON NAME Big Brown Bat

SCIENTIFIC NAME Eptesicus fuscus pallidus

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHOR
	Riv Co										
8-16-77	James Reserve Mt. San Jacinto	(Eptesicus fuscus bernardinus)				5300	yellow pine	1	A	♂	P Brow
4-21-77	Brawley						LS	1	A	♀	Imp Co Publ Healt
6-15-77	Brawley						LS	1	A	♀	" /
7-16-77	Cottonwood Spring - Joshua Tree	5S	11E	14	—	3000'	mist net LS palm oasis	1	A	♂	P. Bro
	Imp. Co										
7-15-77	El Centro						maternity roost LS - Bldg	~100	J	adults ♀+♂	P. Bro
7-29-77	Dessan Mine Chocolate Mtns	11S	21E	18	SE	1000'	maternity roost LS creosote	20			"
" "	" "	"	"	"	SE	"	" "	2	A	♂	" "
7-30-77	La Colorada Mine Cargo Muchacho Mtns	14S	20E	26		800'	maternity roost LS creosote	10 2	A A	♀ ♂	"
" "	Golden ~~Crown~~ Queen Mine (Cargo Muchacho)	15S	20E	1		1000'	roost " "	6 2 1	J J A	♂ ♀ ♂	"
	San Diego Co										State Publ He
6-17-76	~~Kroto~~ Ramona							1	A	♀	"
8-22-76	Lakeside							1	Im	♂	" "
10-5-76	Vista							1	A	♀	" "
4-28-77	Carlsbad							1	A	♂	" "
4-28-77	North County							1	A	♂	"
7-8-77	Rancho de Jamul	17S	1E			800'	US mist net Coastal sage	1	A	♀	P. Brow
7-9-77	Barrett Lake Flume	18S	2.3E	11	SW	1300'	roost US chaparral	1	A	♂	" "
7-12-77	Canyon City Lakes	18S	4E	24	SE	2500'	mesic US oak woodland	2	A	♀ ♂	" "
7-31-77	Imp Co Padre Madre Mine Cargo Muchacho	15S	21E		13	1000'	maternity roost LS creosote	4	A	♀	P Brown
								4	J	♂	

COMMON NAME Big Brown Bat

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME Eptesicus fuscus pallidus

ned. San Diego Collecrols

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
	Doane Valley Palomar Mtn							1	A	♂	P Krutzsch
	Harrison Canyon							1	A	♂	" "
	Palomar Mtn.							1	A	♂	" "
	Campo							1	A		" "
7-5-39	San Marcos							100	A		" "
	mine Boulder Creek										" "
8-29	Lakeside									♂♀	
9-2	Descanso									♂♀	
12-2											

COMMON NAME Mexican Freetailed bat

SCIENTIFIC NAME Tadarida brasiliensis

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY Imp Co	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORI
3-8-77	Calipatria							1	A	♂	Imp Co H Health De
4-7-77	Lark Spa near Niland							1	A	♀	" "
4-20-77	El Centro Co. Services Bldg							1	A	♂	" "
5-18-77	Ramer Lake Calipatria							1	A	♀	" "
6-3-77	Co Services Bldg El Centro							1	A	♂	" "
10-7-76	El Centro							1	J	♂	" "
7-15-77	El Centro							1	A		P. Brow
	San Diego Co										
3-21-77	Escondido							2	A	♂	State Pub Hea
4-8-77	Del mar							1	A	♂	" "

COMMON NAME Yuma myotis	BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME Myotis yumanensis sociabilis

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
	San Diego Co										
10-4-76	Bonita							1	A	♂	State Publ Heal
10-4-76	Lakeside							1	A	♀	"
10-5-76	San Diego							1	A	♂	"
10-19-76	Carlsbad							1	A	♀	"
12-2-76	Santee Sycamore Canyon							1	A	♂	"
9-16-76	Camp Pendleton							1 2	A	♀ ♂	" "
7-23-77	Lake Hodges Dam							700-900	Nursery colony		T. McDonnell
6-22-46	Lake Hodges Dam							200	A		P Krutzsc
8-29-46	"							100	"		" "
11-13-46	"							13	"		" "
7-8-77	Rancho de Jamul	17S	1E			800'	Roost coastal sage scrub	200	maternity roost	in barn	P. Braun
" "	"	"	"			"	mistnet over swimming pool	3♀ 1♂	A		" "
7-9-77	Barrett Lake Flume	18S	3E	8	NW	1500'	Roost' Chaparral	4 3	A	♂ ♀	" "
"	" "	18S	3E	8	NW	1500'	Roost "	1	J	♀	" "
7-10-77	" " near Dulzura	18S	2E	11 14	SW	1500'	Roost "	11 4	A	♀ ♂	" "
7-10-77	pond 2 mi SE Dulzura	18S	2E	9		1800'	mistnet "	3	A	♀	" "
7-12-77	Barrett Lake Flume	17S	3E	28		1800'	Roost "	600	maternity	roost	" "
" "	" "	"	"	"		"	Roost "	50 15	maternal A	♀ ♂	" "

COMMON NAME Canyon bat

SCIENTIFIC NAME Pipistrellus hesperus

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
	Riv Co										
5-21-77	Barker Dam Joshua Tree Mon							2	A		John Cornell
7-12-61	Cottonwood Spring Joshua Tree Mon							1	A	♂	Joshua Tree Mon
7-16-77	Cottonwood Spring Joshua Tree	5S	11E	14	—	3000'	LS mistnet palm oasis	1	A	♂	P. Brown
7-17-77	" "	"	"	"	—	"	"	1	A	♂	P Brown
7-17-77	Visitors Center "	5S	11E	11		3200'	US mistnet juniper	1 8	A	♀ ♂	" "
7-23-77	~~[illegible]~~ Chiriaco Summit	6S	12E	10		1600'	LS mistnet creosote desert	2	A	♂	" "
7-25-77	Corn Springs	6S	16E			1500'	LS mistnet palm oasis	4 1	A	♂ ♀	" "
7-27-77	Stonehouse mine Mule Mtns	8S	21E	4 3	W½	800'	roost LS creosote	1	J A	♀	" "
7-27-77	Quarry Pond Mule Mtns	8S	21E	34	E½	500'	mistnet LS creosote	12 8	A	♀ ♂	" "
	San Diego Co										
9-8-76	Jamul						Coastal Sage scrub	1	im	♀	State H Health
7-12-77	Canyon City Lakes	18S	4E	24	SE	2500'	mistnet US oakwoodland	2 1	A	♀ ♂	P Brown
7-13-77	Dubber Spur	17S	8E	32	SW	2800'	mistnet US mesquite	1	A	♂	" "
8-1-77	Lake Domingo	18S	7E	9	SW	3300'	mistnet US juniper oak	1	A	♀	" "
	Imp. Co										
7-29-77	Gold Rock Ranch 2mi W Cargo Muchachos	15S	20E	4	SE	500'	mist net LS creosote	5 1	A	♂ ♀	P Brown
7-30-77	Amer. Girl Wash Cargo Muchacho	15S	21E			800'	desert mist net LS riparian	1	J	♀	" "

COMMON NAME

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME Pipistrellus hesperus

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
	San Diego Co										
C46 2-5 - ?	Agua Caliente Spring							1	A	♂	P. Krutzs
2-6 ?	" "							1	A	♂	" "
3-20	Vallecito							1	A	♂	" "
3-31	Jacumba							2	A	♀	" "
4-1	Palmetto Springs							1	A	♂	" "
4-2	Witch Creek							1	A	♂	" "
4-4	La Puerta							1	A	♀	" "
5-8	Banner Jt.							1	A	♂	" "
5-24 5-15	Vallecito							1 7	A A	♀ ♀	" "
5-17 5-16	Carrizo Creek							2 1	A A	♂ ♀	" "
5-27	Vallecito							1	A	♂	" "
7-27	" "							1 2	A	♂ ♀	" "
8-4	Palm Canyon Borrego							1	A	♀	"
8-10	Escondido							1	A	♀	"
9-11	Chimney Camp							1 1	A	♂ ♀	" "
10-21	Vallecito							1	A	♀	"
11-9	Painted Gorge							1	A	♂	" "

COMMON NAME Yuma myotis

SCIENTIFIC NAME Myotis yumanensis yumanensis

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORI
7-27-77	Stonehouse mine mule Mtns	8S	21E	34	W½	800'	LS creosote roost	3 29	banded A	♀ ♂	P. Brow
" "	"							total roost 230			" "
" "	Quarry Pond mule Mtns	8S	21E	4	E½	500'	mistnet LS "	1	A	♂	" "

COMMON NAME Pocketed free-tailed bat

SCIENTIFIC NAME Tadarida femorosacca

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
5-21-77	Barker Dam Joshua Tree N.Mon						pinyon & juniper	1	A	♂	per John Cornell

COMMON NAME Lump-nosed bat

SCIENTIFIC NAME Plecotus townsendii

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
	San Diego Co.										
7-9-77	Barrett Lake flume	18S	3E	8	NW	1500'	Roost US Chaparral	7 6	A	♂ ♀	P. Brown
7-10-77	" " near Dulzura	18S	2E	11	SW	1300'	Roost US Chaparral	1	A	♂	" "
7-12-77	Barrett Lake flume	17S	3E	28		1800'	Roost US Chaparral	1 3	A	♀ ♂	" "
7-13-77	Greenhead Lake (mine tunnel)	16S	5E	5		4400'	Roost US Juniper manzanita	1	A	♀	" "

COMMON NAME California myotis

SCIENTIFIC NAME Myotis californicus stephensi

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
5-20-77	~~Imple~~ El Centro							1	A		Imp Co Pub Health
io Co 5-22-77	Lost Horse Ranger Station Joshua Tree Mon							1	A	♂	John Connelly
5-27-77	" "							1	A	♂	" "
7-12-61	Cottonwood Spring, Joshua Tree Mon							1	A		Joshua Tree Mon
7-16-77	Cottonwood Spring Joshua Tree	5S	11E	14	—	3000'	LS mistnet Mimcasia	1 1	A	♂ ♀	P. Brown
7-17-77	Visitors Center Cottonwood	5S	11E	11		3200'	mistnet US-yucca	5 4	A	♀ ♂	" "
[illegible]-27-77	Quarry Pond Mule Mine	8S	21E	34	E½	500'	mistnet LS Creosote	1	A	♀	" "
perial Co 7-29-77	Dixon Mine (Chocolate Mtns)	11S	21E	18	SE	1000'	Roost LS Creosote	1	A	♂	" "
7-30-77	La Colorado Mine Cargo Muchacho	14S	20E	26	SE	800'	Roost LS creosote	1	A	♂	" "
7-30-77	Golden Queen Mine Cargo Muchacho	15S	20E	1		1000'	Roost LS creosote	1	A	♂	" "
7-31-77	American Girl Mine Cargo Muchacho	15S	21E			1000'	Roost LS Creosote	1 1	A	♂ ♀	" "
7-31-77	Guadalupe Mine, Cargo Muchachos	15S	21E			1000'	" "	1	A	♂	" "
7-27-46	Blair Valley							1	A	♂	P. Krutzsch
3-31-46	Borrego Valley							1	A	♂	" "
7-21	Vallecito							2	A	♀	" "
Myotis californicus californicus)											
	San Diego Co										
10-7-76	Ramona							1	A	♂	State ~~ES~~ Publ Health
8-17-41	Pine Hills							1	A	♀	P. Krutzsch
5-1-43	Descanso Creek							2	A		" "
	Camp Marston							2	A		" "

COMMON NAME

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME *Myotis californicus californicus*

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
5-9-46	Witch Creek							1	A	♀	P Krutzsch
5-17-46	Palomar Doane Valley							1	A	♂	" "
5-24-46	Lake Cuyamaca							1	A	♀	" "
6-20	Palomar Mtn							3	A		" "
7-2-46	Julian				-			1	A	♀	" "
9-25-46	San Diego State							1	A	♂	" "
	Myotis californicus stephensi										
	San Diego Co										
4-19	La Puerta Valley							1	A	♂	P Krutzsc
8-27	" "							1	A	♀	" "
10-8	Vallecito							1	A	♀	" "
12-24	Borrego Springs							1	A		" "

COMMON NAME Cave myotis

SCIENTIFIC NAME Myotis velifer)

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
27-77	Stonehouse Mine Mule Mtns	8S	21E	34	N½	800'	LS Roost Creosote	2/100	A	♂	P.Brown
"	"						" "	random 13	sexed A	♂	" "
-27-77	Quarry Pond Mule Mtns	8S	21E	34	E½	500'	mistnet LS creosote	1	A	♂	" "

COMMON NAME yellow bat

SCIENTIFIC NAME Lasiurus ega

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
4-26-77	El Centro							1	A	♂	Imp. Co Public Hea
5-19-77	Holtville							1	A	♀	" "
	San Diego Co										
10-5-76	Vista							1	A	♂	State Pub Heal

COMMON NAME Small footed myotis

SCIENTIFIC NAME Myotis leibii

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
7-12-77	Canyon Lily Lakes	18S	4E	24	SE	2500	mistnet US cottonwoods	4 1	A	♀ ♂	P Brow
7-13-77	Dubber Spur	17S	8E	32	SW	2800'	mistnet US mesquite	2 1	A	♂ ♀	" "
6-30-35	mine 4.8 mi E Laguna St.							1	A		P Krutsc
10-11-36	" "							15	A		"
5-31-37	" "							8	A		"
[illegible]	[illegible]										
9-11-46	Denesa							1	A	♂	" "
9-10-46	Chimney Camp							1	A	♂	

COMMON NAME Small footed myotis

SCIENTIFIC NAME Myotis leibii

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
7-12-77	Canyon Lity Lakes	18S	4E	24	SE	2500	mistnet US cottonwoods	4 11	A	♀ ♂	P Brown
7-13-77	Dubbers Spring	17S	8E	32	SW	2800'	mistnet US mesquite	2 1	A	♂ ♀	" "
6-30-35	mine 4.8 mi E Laguna Jt.							1	A		P Krutsch
10-11-36	" "							15	A		"
-31-37	" "							8	A		"
~~[illegible]~~ ~~[illegible]~~	~~[illegible]~~										
9-11-46	Denesa							1	A	♂	" "
9-10-46	Chimney Camp							1	A	♂	

COMMON NAME Fringed myotis

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME myotis thysanodes thysanodes

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
8-27-50	Riverside Co Lower Covington Flat-Joshua Tree Mon					5000'	U.S. pinyon juniper	1	A	♂	MVZ Berkeley
6-24-1892	San Diego Co San Luis Mtns Mexican boundary							2	A	♀	U.S. Nat'l Mus
8-2-46	Doane Valley Palomar Mt							2	A	♂	MVZ Berkeley
-18-46	4.8 mi E Laguna Jt Laguna Mtns							6	A	♀	"
6-6-46	Pine Valley							1	A	♂	P Krutsc
3-6-46	La Puerta Valley							1	A	♂	" "
4-10-46	" "							1	A	♂	" "
7-3-46	5 mi E Laguna Jt							1	A	♂	" "
8-3-46	Julian							1	A	~~♀~~♂	" "
8-4-46	Banner							1	A	♂	" "
9-14-46	Cuyamaca Mtn							1	A	♂	" "

COMMON NAME Big free-tailed bat

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME Tadarida macrotis

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORITY
0-12-76	State Univ San Diego							1	A	♂	State Dept Health
2-7-70	Mission Beach							1	A	♂	Univ of San D

COMMON NAME long-eared Myotis

SCIENTIFIC NAME Myotis evotis

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY San Diego Co	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
7-13-77	Dubber Spur	17S	8E	32	SW	2800'	mist net mesquite scrub US	4 1	A	♀ ♂	P. Brow
8-1-77	Lake Domingo	18S	7E	9	SW	3300'	mist net oak US Juniper	1	A	♀	" "
4-1-46	Hubbard's Grove							1	A	♂	P. Krutzs
6-20-46	Palomar Mtn.							1	A	♂	" "
7-23 ?	Descanso town hall							2	A		" "
7-25 ?	Pine Hills							1	A	♂	" "
9-5 ?	Doane Valley Palomar Mtn							8	A	♀	" "
9-9 ?	Laguna Mtn							1	A	♂	" "
9-29 ?	Fisherman's Camp Boulder Creek							1	A	♂	" "
10-10 ?	Dulzura							1	A	♂	" "
10-10 ?	Vallecito							1	A	♀	" "
10-20	Vallecito							1	A	♂	" "

COMMON NAME Pallid bat (desert)

SCIENTIFIC NAME Antrozous pallidus pallidus

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORI
8-18-62	Pinto Wash Well Joshua Tree Natl Mon.							1	A	♂	Joshua Tree Mc
7-16-77	Cottonwood Spring - Joshua Tree	5S	11E	14	—	3000'	mistnet LS Palm oasis Riparian	2 1	A	♂ ♀	P.Brow
7-27-77	Stonehouse mine Mule Mtns	8S	21E	34	W½	800'	LS. creosote maternity roost	5	♀	A+J	〃
7-27-77	〃 〃	〃	〃	〃		〃	〃 roost	2	J	♂	〃
5-29-46	Jacumba							1	A	♀	P Krutzs.
San Diego Co											
Antrozous pallidus pacificus											
8-1-77	Lake Domingo	18S	7E	9	SW	3300'	mistnet US oak juniper	1	A	♀	P Brow

COMMON NAME Hoary bat
SCIENTIFIC NAME Lasiurus cinereus

BLM-Wildlife
Vertebrate Species Distribution Data

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORI
5-19-77	Barkers Dam Joshua Tree Mon.							1	A	♀ (2 embryos	John Cornel
5-21-77	" "							1	A	♂	" "
	San Diego Co										
11-19-76	Fallbrook							1	J	♂	State Pub Hea
12-13-76	" "							1	A	♂	"
12-14-76	San Diego							1	A	♂	"
11-4-76	San Diego							1	A	♂	"
1-14-77	Bonita							1	A	♀	" "
1-13-77	El Cajon							1	A	♀	"
1-27-77	Encinitas							1	A	♀	" "
1-31-77	Poway							1	A	♀	" "
2-7-77	San Diego							1	A	~~♀~~ ♂	"
3-4-77	El Cajon							1	A	♀	"
3-8-77	La Jolla							1	A	♀	" "
3-15-77	San Diego							1	A	♂	"
4-15-77	La mesa							1	A	♂	"

COMMON NAME Spotted bat

BLM-Wildlife
Vertebrate Species Distribution Data

SCIENTIFIC NAME Euderma maculatum

DATE	LOCALITY	T	R	S	1/4S	ELEV	HABITAT	#	AGE	SEX	AUTHORIT
9-55	University of San Diego							1	A	♀	Univ of San Dieg

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